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ADOPTION OF ARTIFICIAL INTELLIGENCE IN SUPPLY CHAIN MANAGEMENT: BARRIERS AND ENABLERS IN DEVELOPING ECONOMIES

DR SHAIBU, OGWUCHE GABRIEL[1*], DR EMEM AKANINYENE SAMPSON[2], . DR MBAEGBU R. E. V.[3], V/REV DR CHIKEZIE IHEOMA[4], OKEBARAM HUMPHREY CHIBO[5], DR IBRAHIM MUSA[6]

[1] DEPARTMENT OF BUSINESS EDUCATION, ALVAN IKOKU FEDERAL UNIVERSITY OF EDUCATION, OWERRI, IMO STATE, NIGERIA.

[2] DEPARTMENT OF MARKETING, UNIVERSITY OF UYO, NIGERIA.

[3, 4, 5] DEPARTMENT OF BUSINESS EDUCATION, ALVAN IKOKU FEDERAL UNIVERSITY OF EDUCATION, OWERRI, IMO STATE, NIGERIA.

[6] DEPARTMENT OF ECONOMICS, UNIVERSITY OF ABUJA NIGERIA.

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***Corresponding author:** DR SHAIBU, OGWUCHE GABRIEL

Abstract

Artificial Intelligence (AI) has emerged as a transformative technology capable of enhancing efficiency, decision-making, and resilience in supply chain management. However, its adoption in developing economies remains constrained by several technological, organizational, and environmental challenges. This study examined the adoption of Artificial Intelligence in supply chain management, with emphasis on the barriers and enablers in developing economies, using Nigeria as the study context. A cross-sectional survey research design was adopted, and data were collected from 235 employees, managers, and supply chain professionals in selected manufacturing firms, logistics companies, retail organizations, and small and medium-sized enterprises (SMEs) in Nigeria using a structured questionnaire titled Artificial Intelligence Adoption in Supply Chain Management Index (AIASCMI). Data were analyzed using descriptive statistics and Pearson Product Moment Correlation. The findings revealed that identified barriers, including inadequate digital infrastructure, high implementation costs, shortage of skilled personnel, and organizational challenges, have a significant negative relationship with the adoption of Artificial Intelligence in supply chain management. The study also found that identified enablers, such as top management support, technological readiness, employee competence, and government support, significantly influence the successful adoption of Artificial Intelligence. The study concludes that overcoming existing barriers while strengthening organizational and technological capabilities is essential for the successful adoption of Artificial Intelligence in supply chain management. It is recommended that organizations invest in digital infrastructure, workforce development, and supportive management practices to maximize the benefits of Artificial Intelligence and improve supply chain performance.

Keywords: Artificial Intelligence, Supply Chain Management, Artificial Intelligence Adoption, Barriers, Enablers, Developing Economies.

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Introduction

The increasing complexity of global markets, rapid technological advancement, and growing customer expectations have compelled organizations to rethink how supply chains are managed. Supply chain management (SCM) involves the planning, coordination, and control of activities associated with the sourcing, production, distribution, and delivery of goods and services from suppliers to end users (Christopher, 2016). In recent years, Artificial Intelligence (AI) has emerged as a transformative technology capable of improving supply chain operations through automation, predictive analytics, machine learning, computer vision, and intelligent decision-making. These AI-driven technologies enable organizations to optimize inventory management, improve demand forecasting, reduce operational costs, and enhance supply chain resilience (Ivanov & Dolgui, 2021).

Artificial intelligence enables firms to process large volumes of structured and unstructured data, identify patterns, and generate insights that support real-time decision-making across the supply chain. According to Ivanov and Dolgui (2021), AI improves supply chain visibility by enabling organizations to predict disruptions, optimize logistics operations, and make proactive decisions during periods of uncertainty. Similarly, Bag, Dhamija, Bryde, and Singh (2021) noted that AI technologies contribute to operational efficiency by supporting intelligent procurement, warehouse automation, transportation planning, and supplier relationship management. These capabilities have become increasingly important as organizations seek to build resilient and agile supply chains in an increasingly volatile business environment. The adoption of artificial intelligence enhances organizational productivity and service efficiency by improving the quality and speed of operational processes, indicating the growing importance of AI across diverse organizational functions (Shaibu, Mbaegbu, & Zion-Ngoka, 2025).

The application of AI in supply chain management extends across several operational areas. Machine learning algorithms improve demand forecasting by analyzing historical sales data and market trends, while AI-powered robotics enhance warehouse operations through automated picking, sorting, and inventory control. Predictive analytics assists organizations in identifying potential supply chain risks before they occur, enabling timely intervention and minimizing operational disruptions (Toorajipour, Sohrabpour, Nazarpour, Oghazi, & Fischl, 2021). Furthermore, AI-supported decision systems facilitate supplier selection, route optimization, and production scheduling, leading to improved service delivery and reduced operational costs.

Despite these benefits, the adoption of artificial intelligence in supply chain management remains uneven, particularly in developing economies. Many organizations face challenges such as inadequate digital infrastructure, high implementation costs, limited access to quality data, shortage of AI-skilled personnel, cybersecurity concerns, and weak institutional support (Bag et al., 2021; Toorajipour et al., 2021). At the same time, several factors including top management commitment, government support, digital transformation initiatives, technological readiness, and employee competence have been identified as critical enablers of successful AI adoption. Understanding these barriers and enablers is essential for organizations seeking to improve supply chain performance and remain competitive. Therefore, this study examines the adoption of artificial intelligence in supply chain management, with particular emphasis on the barriers and enablers influencing its implementation in developing economies.

Statement of the Problem

The growing adoption of Artificial Intelligence has created significant opportunities for organizations to improve efficiency, responsiveness, and resilience within supply chain operations. Nevertheless, many organizations in developing economies continue to rely on conventional supply chain practices characterized by limited automation, poor data integration, inefficient inventory management, and delayed decision-making. These challenges often result in high operational costs, supply disruptions, inaccurate demand forecasting, and reduced competitiveness in both domestic and international markets.

Although AI technologies have demonstrated considerable potential in transforming supply chain management, their adoption in many developing economies remains relatively low. Several organizations encounter obstacles such as inadequate digital infrastructure, high acquisition and maintenance costs, insufficient technical expertise, poor data quality, cybersecurity concerns, and resistance to organizational change. In addition, weak institutional support and limited investment in digital technologies continue to hinder the successful implementation of AI-based supply chain solutions.

Conversely, factors such as strong managerial commitment, technological readiness, government support, employee digital competence, and strategic partnerships have been identified as important enablers that can facilitate AI adoption. However, empirical evidence on how these barriers and enablers influence AI adoption in supply chain management within developing economies remains limited. Without a clear understanding of these factors, organizations may struggle to make informed investment decisions and achieve the expected benefits of AI implementation. It is against this background that this study seeks to examine the barriers and enablers influencing the adoption of artificial intelligence in supply chain management in developing economies.

Objectives of the Study

The main aim of this study is to examine the adoption of artificial intelligence in supply chain management, with emphasis on the barriers and enablers in developing economies. The specific objectives are to:

1. Examine the barriers affecting the adoption of artificial intelligence in supply chain management in developing economies.
2. Determine the enablers that facilitate the adoption of artificial intelligence in supply chain management in developing economies.

Research Questions

To achieve the objectives of the study, the following research questions are raised:

1. What are the barriers affecting the adoption of artificial intelligence in supply chain management in developing economies?
2. What are the major enablers that facilitate the adoption of artificial intelligence in supply chain management in developing economies?

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Research Hypotheses

Ho_1: There is no significant relationship between the identified barriers and the adoption of artificial intelligence in supply chain management in developing economies.

Ho_2: The identified enablers do not significantly influence the adoption of artificial intelligence in supply chain management in developing economies.

Literature Review

Concept of Artificial Intelligence

Artificial Intelligence (AI) has become a significant technological innovation influencing how organizations operate, make decisions, and improve performance in the modern digital economy. AI refers to computer-based systems designed to perform tasks that traditionally require human intelligence, including learning, reasoning, problem-solving, perception, and decision-making (Russell & Norvig, 2021). In business environments, AI involves the use of advanced computational techniques that enable organizations to analyze large volumes of data, generate insights, automate processes, and support strategic decisions (Davenport & Ronanki, 2018). Similarly, Chatterjee, Rana, and Dwivedi (2021) describe AI as a collection of intelligent technologies that allow organizations to process information, identify patterns, predict future outcomes, and enhance managerial decision-making.

The growing importance of AI is linked to its ability to transform traditional business processes through automation, predictive capabilities, and data-driven intelligence. According to Brynjolfsson and McAfee (2017), AI provides organizations with opportunities to improve productivity, optimize resources, and achieve competitive advantage by combining human capabilities with advanced digital technologies. Unlike conventional information systems that mainly process predefined instructions, AI systems are capable of learning from data, adapting to changing conditions, and improving their performance over time. These capabilities make AI valuable for organizations operating in complex and uncertain environments.

AI technologies consist of several interconnected applications, including machine learning, deep learning, natural language processing, robotics, computer vision, and predictive analytics. Machine learning enables systems to identify patterns from historical data and make predictions without explicit programming, while deep learning uses advanced neural networks to process complex datasets. Natural language processing allows computers to understand and interpret human language, whereas robotic process automation supports the automation of repetitive tasks. Predictive analytics uses AI algorithms to forecast future events, identify risks, and support proactive decision-making (Dwivedi, Hughes, & Rana, 2021).

In organizational settings, AI serves as a strategic resource that enhances operational efficiency, improves decision accuracy, and supports innovation. AI applications enable firms to analyze real-time information, monitor business activities, optimize resource allocation, and respond quickly to environmental changes. According to Gursoy, Chi, Lu, and Nunkoo (2022), AI-driven systems improve organizational decision-making by providing accurate predictions and automated recommendations that support both strategic and operational activities. These capabilities have increased the relevance of AI across various business functions, including finance, marketing, manufacturing, and supply chain management.

Within supply chain management, AI has gained attention due to its ability to address challenges associated with complexity, uncertainty, and increasing market demands. AI technologies support supply chain activities by improving demand forecasting, inventory management, supplier evaluation, transportation planning, and risk prediction. Ivanov and Dolgui (2021) noted that AI enhances supply chain visibility and resilience by enabling organizations to predict disruptions, analyze supply chain data, and make timely decisions. Similarly, Toorajipour, Sohrabpour, Nazarpour, Oghazi, and Fischl (2021) emphasized that AI applications in supply chains facilitate automation, optimization, and intelligent decision-making across different operational processes.

The adoption of AI represents more than the introduction of new technology; it reflects a strategic shift toward data-driven and intelligent organizational operations. By enabling faster analysis, accurate forecasting, and automated decision support, AI helps organizations improve efficiency and maintain competitiveness in dynamic business environments. Therefore, understanding the concept of AI provides a foundation for examining its adoption in supply chain management, particularly the barriers and enabling factors influencing implementation in developing economies

Artificial Intelligence Adoption in Supply Chain Management

The adoption of Artificial Intelligence (AI) in supply chain management refers to the integration of intelligent technologies into supply chain processes to improve decision-making, automation, efficiency, and responsiveness. AI adoption enables organizations to utilize technologies such as machine learning, predictive analytics, robotics, and intelligent automation to optimize activities including demand forecasting, inventory control, procurement, transportation, and supplier management (Toorajipour, Sohrabpour, Nazarpour, Oghazi, & Fischl, 2021). Unlike traditional supply chain systems that depend mainly on historical information and manual decisions, AI-driven supply chains use real-time data analysis to predict changes, identify risks, and support proactive responses.

According to Ivanov and Dolgui (2021), AI adoption enhances supply chain visibility and resilience by enabling firms to anticipate disruptions, improve operational coordination, and make faster decisions in uncertain environments. Similarly, Bag, Dhamija, Bryde, and Singh (2021) noted that AI technologies contribute to sustainable supply chain performance by improving forecasting accuracy, reducing waste, and strengthening operational capabilities. Through AI adoption, organizations can achieve greater flexibility, cost reduction, and competitive advantage by transforming supply chain activities into more intelligent and data-driven processes.

The successful adoption of AI in supply chain management requires more than technological investment; it also depends on organizational readiness, employee capability, and strategic commitment. Organizations must develop appropriate digital infrastructure, data management systems, and human expertise to effectively integrate AI into supply chain operations. Therefore, AI adoption represents a strategic transformation that enables organizations to improve supply chain performance and respond effectively to changing business environments.

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Artificial Intelligence in Developing Economies

The application of Artificial Intelligence in developing economies presents significant opportunities for improving organizational performance, innovation, and economic development. Developing countries increasingly recognize AI as a tool for addressing operational challenges, improving productivity, and supporting digital transformation. However, the adoption and utilization of AI remain influenced by factors such as technological infrastructure, investment capacity, regulatory support, and availability of skilled personnel (Dwivedi et al., 2021).

In supply chain environments, AI has the potential to support organizations in developing economies by improving logistics efficiency, demand forecasting, inventory management, and risk identification. According to Bag et al. (2021), AI-based supply chain solutions can help firms overcome operational limitations by providing accurate insights and enabling better resource utilization. However, many organizations in developing economies face challenges such as inadequate digital infrastructure, limited access to quality data, and high implementation costs, which slow down AI adoption.

The growing interest in AI adoption among developing economies demonstrates the need for organizations to strengthen technological capabilities and create supportive environments for innovation. Shaibu, Mbaegbu, and Zion-Ngoka (2025) observed that AI adoption improves organizational productivity and operational efficiency by enhancing process quality and decision-making capabilities. Therefore, effective AI adoption in developing economies requires collaboration among organizations, government institutions, and technology providers to address existing barriers and maximize the benefits of artificial intelligence.

Barriers to Artificial Intelligence Adoption in Supply Chain Management

Despite the potential benefits of Artificial Intelligence (AI) in improving supply chain performance, many organizations continue to experience difficulties in adopting and implementing AI-driven solutions. The adoption of AI in supply chain management is influenced by technological, organizational, financial, and environmental challenges. According to Queiroz and Fosso Wamba (2019), inadequate technological capabilities, limited data availability, and integration difficulties remain major obstacles affecting the implementation of advanced digital technologies within supply chains.

One major barrier to AI adoption is the high cost associated with acquiring, implementing, and maintaining AI systems. Organizations require significant investments in digital infrastructure, data platforms, software development, and employee training before AI technologies can generate value. In developing economies, where many firms operate with limited financial resources, these costs often discourage investment in AI-based supply chain solutions (Dwivedi, Hughes, Coombs, Constantiou, Duan, Edwards, Gupta, Lal, Misra, Prashant, Raman, Rana, Sharma, & Upadhyay, 2023).

Another critical challenge is the shortage of skilled personnel capable of managing AI technologies. Effective AI adoption requires employees with expertise in data analytics, machine learning, information systems, and supply chain processes. However, many developing economies face gaps in digital skills, making it difficult for organizations to successfully integrate AI into their operations. In addition, concerns relating to data privacy, cybersecurity, and the reliability of AI-generated decisions can reduce organizational willingness to adopt AI solutions (Hao & Demir, 2024).

Infrastructure limitations also affect AI adoption, particularly in developing economies. Poor internet connectivity, inadequate digital systems, unreliable power supply, and weak data management practices limit organizations' ability to deploy AI effectively. In the Nigerian supply chain environment, Hassan (2024) identified technological infrastructure, leadership commitment, and regulatory conditions as important factors influencing AI adoption, highlighting the challenges organizations face when attempting to implement AI-driven supply chain systems.

Enablers of Artificial Intelligence Adoption in Supply Chain Management

The successful adoption of Artificial Intelligence in supply chain management depends on several enabling factors that create favourable conditions for implementation. These factors include technological readiness, organizational support, skilled workforce availability, and supportive external environments. According to Margherita and Braccini (2021), organizations that possess strong digital capabilities and innovation-oriented cultures are more likely to successfully adopt emerging technologies such as AI.

Top management support is considered one of the major enablers of AI adoption because organizational leaders provide strategic direction, financial resources, and commitment required for digital transformation. Similarly, technological readiness, including access to reliable ICT infrastructure, quality data, and integrated information systems, enhances organizations' ability to implement AI-based supply chain solutions (Alamri, Alotaibi, & Alharbi, 2023).

Government policies and institutional support also play an important role in encouraging AI adoption, especially in developing economies. Supportive regulations, investment incentives, digital infrastructure development, and partnerships between government, universities, and industries can strengthen organizations' capacity to adopt AI technologies. Hassan (2024) found that leadership support, technological infrastructure, and regulatory considerations were significant drivers of AI adoption within Nigeria's supply chain management landscape.

Furthermore, employee competence and continuous training are essential enablers because AI adoption requires workers who can understand, operate, and manage intelligent systems. Hao and Demir (2024) emphasized that successful AI implementation depends on coordinated technological, organizational, and environmental factors throughout the AI adoption process. Therefore, organizations in developing economies need to strengthen digital capabilities, invest in human capital development, and create supportive innovation environments to maximize the benefits of AI adoption in supply chain management.

DOI theory is relevant to Artificial Intelligence adoption in supply chain management because organizations evaluate AI technologies based on their perceived usefulness and compatibility with existing supply chain processes. Organizations are more likely to adopt AI when they recognize its advantages, such as improved forecasting accuracy, enhanced operational efficiency, reduced costs, and

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better supply chain resilience. However, perceived complexity, lack of technical knowledge, high implementation costs, and uncertainty about AI outcomes may slow adoption.

In developing economies, DOI theory helps explain differences in AI adoption levels among organizations. Firms with greater awareness of AI benefits, stronger technological capabilities, and supportive innovation cultures are more likely to adopt AI-driven supply chain solutions. Conversely, organizations facing limited resources, inadequate knowledge, and resistance to technological change may experience slower adoption. Thus, DOI theory provides insight into how organizations perceive, evaluate, and ultimately decide whether to adopt Artificial Intelligence in supply chain management.

Empirical Review

Hassan (2024) examined the factors influencing Artificial Intelligence adoption within Nigeria's supply chain management environment. The study focused on organizational and environmental factors affecting AI implementation among Nigerian organizations. Findings indicated that technological infrastructure, leadership commitment, employee competence, and regulatory support significantly influence AI adoption decisions. The study also identified inadequate digital infrastructure, limited technical skills, and weak institutional support as major constraints affecting AI implementation. The study recommended investment in digital capabilities, workforce development, and supportive policies to improve AI adoption in Nigeria.

Shaibu, Mbaegbu, and Zion-Ngoka (2025) examined the influence of Artificial Intelligence adoption on organizational productivity in Nigeria. The study found that AI adoption improves operational efficiency, decision-making quality, and service delivery by enabling organizations to automate processes and utilize data-driven insights. The authors highlighted that effective AI implementation requires organizational readiness, employee knowledge, and technological support. Although the study was not limited to supply chain management, its findings provide evidence that AI adoption contributes to improved organizational performance within the Nigerian business environment.

Toorajipour, Sohrabpour, Nazarpour, Oghazi, and Fischl (2021) conducted a systematic literature review to examine the role of Artificial Intelligence in supply chain management. The study analyzed existing research on AI applications, including machine learning, robotics, predictive analytics, and intelligent decision-support systems. The findings revealed that AI significantly improves supply chain activities such as demand forecasting, inventory management, logistics optimization, and risk management. However, the study identified several challenges limiting AI adoption, including data availability issues, technological complexity, and shortage of technical expertise. The study concluded that organizations require adequate digital capabilities and skilled personnel to successfully integrate AI into supply chain operations.

Bag, Dhamija, Bryde, and Singh (2021) examined the effect of Artificial Intelligence on sustainable supply chain performance. The study investigated how AI capabilities influence supply chain resilience and operational effectiveness. Using empirical data, the authors found that AI adoption improves supply chain resilience by enhancing decision-making, forecasting accuracy, and operational coordination. The study also revealed that organizational readiness and technological capability are important factors influencing successful AI implementation. The authors recommended that organizations invest in digital infrastructure and employee skills development to maximize AI benefits in supply chain management.

Queiroz and Fosso Wamba (2019) investigated factors influencing the adoption of emerging digital technologies within supply chain environments. Although the study focused broadly on digital technology adoption, its findings are relevant to AI adoption because AI depends heavily on digital infrastructure and data capabilities. The study found that technological readiness, organizational support, and perceived benefits encourage technology adoption, while inadequate infrastructure, implementation complexity, and lack of knowledge create adoption barriers. The authors emphasized that organizations in developing economies require stronger digital foundations before fully benefiting from advanced technologies.

Methods

The study adopted a cross-sectional survey research design. The population of the study comprised employees, managers, and supply chain professionals involved in logistics, procurement, inventory management, manufacturing, and distribution activities in selected organizations in developing economies, with particular focus on organizations operating in Nigeria. These organizations were considered appropriate because they are increasingly exposed to digital transformation initiatives and emerging technologies such as Artificial Intelligence (AI) in supply chain operations. A purposive sampling technique was employed to select respondents who possess practical knowledge and experience in supply chain activities and technology adoption decisions. A total of 250 respondents were selected from manufacturing firms, logistics companies, retail organizations, and small and medium-scale enterprises (SMEs). Data were collected using a structured questionnaire titled Artificial Intelligence Adoption in Supply Chain Management Index (AIASCMI). The instrument was developed based on the study objectives and relevant literature on AI adoption, technological barriers, and organizational enablers. The questionnaire was structured on a five-point Likert scale with the response options: Strongly Agreed (SA) = 5, Agreed (A) = 4, Undecided (U) = 3, Disagreed (D) = 2, and Strongly Disagreed (SD) = 1. The instrument was validated by experts in supply chain management, business management, and information technology to ensure content validity. Reliability testing was conducted using Cronbach Alpha, and a reliability coefficient of 0.85 was obtained, indicating that the instrument possessed adequate internal consistency. Out of the 250 questionnaires administered, 235 copies were successfully retrieved and found usable for analysis, representing a response rate of 94%. Data collected were analyzed using descriptive statistics, including mean scores, frequencies, and percentages, to summarize respondents' demographic characteristics and perceptions regarding AI adoption in supply chain management. Inferential statistics, including Pearson Product Moment Correlation and Multiple Regression Analysis, were employed to test the research hypotheses at a 0.05 level of significance. The analysis was conducted using the Statistical Package for Social Sciences (SPSS) Version 26.

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Results

Ho_1: There is no significant relationship between the identified barriers and the adoption of Artificial Intelligence in supply chain management in developing economies.

Table 1: Correlation between Identified Barriers and Artificial Intelligence Adoption in Supply Chain Management.

Theoretical Review

Technology–Organization–Environment (TOE) Theory

The Technology–Organization–Environment (TOE) framework was developed by Tornatzky and Fleischer (1990) to explain how organizations adopt and implement technological innovations. The theory suggests that technology adoption decisions are influenced by three major contexts: technological factors, organizational factors, and environmental factors. The technological context relates to the availability, suitability, complexity, and benefits of the technology being adopted. The organizational context focuses on internal factors such as management support, financial resources, employee skills, and organizational readiness, while the environmental context considers external influences including government regulations, competitive pressure, and industry support.

In the context of Artificial Intelligence adoption in supply chain management, TOE theory provides a useful explanation of why some organizations successfully implement AI while others experience difficulties. Technological factors such as digital infrastructure, data quality, system compatibility, and AI capability influence the readiness of organizations to adopt AI solutions. Organizational factors, including top management commitment, financial capacity, employee competence, and innovation culture, determine the ability of firms to integrate AI into supply chain operations. Environmental factors such as government policies, regulatory frameworks, market competition, and technological partnerships also influence AI adoption decisions.

The TOE framework is particularly relevant to developing economies where organizations often face challenges related to infrastructure limitations, financial constraints, and weak institutional support. By considering technological, organizational, and environmental conditions, the theory provides a comprehensive explanation of both the barriers and enablers influencing AI adoption in supply chain management. Therefore, TOE theory serves as an appropriate foundation for understanding how internal and external factors shape organizations' willingness and ability to adopt AI technologies.

Diffusion of Innovation (DOI) Theory

The Diffusion of Innovation (DOI) theory was developed by Rogers (2003) to explain how new ideas, technologies, and innovations spread and become adopted within social and organizational systems. The theory proposes that the adoption of an innovation is influenced by five key characteristics: relative advantage, compatibility, complexity, trialability, and observability. Innovations that provide clear benefits, align with existing practices, are easy to understand, can be tested, and produce visible results are more likely to be adopted.

Variables	N	Correlation Coefficient (r)	Sig. (2-tailed)
Identified Barriers	235	1.000	–
Artificial Intelligence Adoption	235	-0.684	0.000

Correlation is significant at 0.05 level (2-tailed).

Source: Researchers' Data, 2026.

Table 1 indicates a correlation coefficient (r) of -0.684 with a significance value of 0.000, which is less than the 0.05 level of significance. Since the significance value (0.000) is below 0.05, the null hypothesis (Ho_1), which states that there is no significant relationship between the identified barriers and the adoption of Artificial Intelligence in supply chain management in developing economies, is rejected. Therefore, the alternative hypothesis is accepted. This implies that the identified barriers have a significant negative relationship with the adoption of Artificial Intelligence in supply chain management. In other words, as barriers such as inadequate digital infrastructure, high implementation costs, shortage of skilled personnel, and poor organizational readiness increase, the level of AI adoption decreases.

Ho_2: The identified enablers do not significantly influence the adoption of Artificial Intelligence in supply chain management in developing economies.

Table 2: Correlation between Identified Enablers and Artificial Intelligence Adoption in Supply Chain Management

Variables	N	Correlation Coefficient (r)	Sig. (2-tailed)
Identified Enablers	235	1.000	–
Artificial Intelligence Adoption	235	0.756	0.000

Correlation is significant at 0.05 level (2-tailed).

Source: Researchers' Data, 2026.

Table 2 shows a correlation coefficient (r) of 0.756 with a significance value of 0.000, which is less than the 0.05 alpha level. Since the significance value (0.000) is below 0.05, the null hypothesis (Ho_2), which states that the identified enablers do not significantly influence the adoption of Artificial Intelligence in supply chain management in developing economies, is rejected. Therefore, the alternative hypothesis is accepted. This indicates that the identified enablers significantly influence the adoption of Artificial Intelligence in supply chain management. Factors such as top management support, technological readiness, employee competence, and government support play significant roles in encouraging organizations to adopt AI technologies.

Discussion

The findings of this study revealed that the identified barriers have a significant negative relationship with the adoption of Artificial Intelligence in supply chain management. The correlation analysis produced a coefficient of $r = -0.684$ ($p < 0.05$), indicating that organizations experiencing greater challenges are less likely to adopt AI technologies in their supply chain operations. The major barriers include inadequate digital infrastructure, high implementation costs, shortage of skilled personnel, poor data quality, and organizational resistance to technological change. This finding agrees with the study conducted by Toorajipour, Sohrabpour, Nazarpour, Oghazi, and Fischl (2021), who reported

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that although Artificial Intelligence improves demand forecasting, inventory management, logistics optimization, and risk management, its adoption is constrained by data availability problems, technological complexity, and shortage of technical expertise. The finding is also consistent with Queiroz and Fosso Wamba (2019), who found that inadequate infrastructure, implementation complexity, and lack of organizational knowledge remain major barriers to the adoption of emerging digital technologies within supply chain environments. Similarly, Hassan (2024) reported that inadequate technological infrastructure, limited digital skills, and weak institutional support significantly hinder Artificial Intelligence adoption among Nigerian organizations. The consistency between the present study and these previous studies suggests that addressing these technological and organizational barriers is necessary for organizations seeking to successfully implement Artificial Intelligence in supply chain management.

The findings further revealed that the identified enablers have a significant positive influence on the adoption of Artificial Intelligence in supply chain management, with a correlation coefficient of $r = 0.756$ ($p < 0.05$). This indicates that organizations with strong management commitment, adequate technological infrastructure, skilled employees, and supportive government policies are more likely to adopt Artificial Intelligence successfully. This finding is in agreement with Bag, Dhamija, Bryde, and Singh (2021), who found that Artificial Intelligence adoption improves supply chain resilience, operational efficiency, forecasting accuracy, and decision-making, while emphasizing that organizational readiness and technological capability are essential for successful implementation. The finding also supports the study of Shaibu, Mbaegbu, and Zion-Ngoka (2025), who reported that Artificial Intelligence adoption enhances organizational productivity, service delivery, and decision-making quality through process automation and data-driven insights. The authors further emphasized that employee competence, technological support, and organizational readiness are critical factors for effective Artificial Intelligence implementation. The agreement between these empirical studies and the present findings demonstrates that organizations in developing economies can improve Artificial Intelligence adoption by investing in digital infrastructure, strengthening employee capabilities, encouraging top management support, and creating an enabling policy environment.

Overall, the findings indicate that although technological, financial, and organizational barriers continue to affect the adoption of Artificial Intelligence in supply chain management, the presence of strong enabling factors significantly enhances successful implementation. Organizations that invest in digital capabilities, employee development, and supportive leadership are better positioned to maximize the operational and strategic benefits associated with Artificial Intelligence adoption in supply chain management.

Conclusion

This study examined the adoption of Artificial Intelligence in supply chain management, with emphasis on the barriers and enablers in developing economies, using Nigeria as the study context. The findings revealed that identified barriers such as inadequate digital infrastructure, high implementation costs, shortage of skilled personnel, and organizational challenges significantly hinder the adoption of Artificial Intelligence in supply chain management. Conversely, the study established that enablers such as top management support, technological readiness, employee competence, and supportive government policies significantly promote the successful adoption of Artificial Intelligence. The study concludes that while Artificial Intelligence has the potential to improve supply chain efficiency, decision-making, and operational performance, its successful adoption depends largely on organizations' ability to overcome existing barriers and strengthen the enabling factors that support digital transformation. Organizations that invest in the necessary technological and human capabilities are more likely to realize the full benefits of Artificial Intelligence in supply chain management.

Recommendations

Based on the objectives of the study, the following recommendations were proposed:

1. Organizations should invest in improving digital infrastructure, developing employee digital skills, and providing adequate financial resources to reduce the barriers that hinder the adoption of Artificial Intelligence in supply chain management. They should also establish effective data management systems and promote organizational readiness to facilitate successful AI implementation.
2. Organizations should strengthen the factors that enable Artificial Intelligence adoption by promoting top management commitment, investing in technological readiness, providing continuous staff training, and collaborating with government agencies and technology providers. These measures will enhance the successful integration of Artificial Intelligence into supply chain operations and improve organizational efficiency, resilience, and competitiveness.

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